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Citizen Science in Archaeology: Developing a Collaborative Web Service for Archaeological Finds in Finland

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Abstract

Metal detecting has become a vivid area of citizen science. In many countries where metal detecting is legal, the rapidly increasing number of finds submitted to authorities managing national archaeological databases has overwhelmed the capabilities of those maintaining the records. We propose an innovative approach for solving the problem by presenting a case study, the Finnish Archaeological Finds Recording Linked Open Database (SuALT) project. The idea is to engage the citizens more deeply in the process of maintaining the database in a mentally rewarding way by educating and helping citizens to make their find reports more accurately and as easily as possible, in place at the find location using a mobile device. SuALT provides a sustainable archaeological repository of Linked Data in Finland, interlinked with related international systems that shall continue to facilitate public engagements with cultural heritage, and research opportunities, long after the project has ended.

Keywords

Metal detecting - Citizen science - Finland - Linked data

Introduction

The relationship between metal detecting and archaeology is an issue that frequently attracts debate, from testimonials of the positive impact of collaborative work (e.g., Balco et al. 2018) to caution about the potential of metal detecting, resulting in destroyed archaeological information, and criminal activity (e.g., Gill 2010). The perception of metal detecting in different countries is affected also by the hobby's legal status. Because there are different degrees of permission relating to metal detecting, it is possible to carry out the same activity in two different jurisdictions, and to be breaking the law in one while acting perfectly legally in another (Thomas 2016: 143). In countries where metal detecting is not illegal, sometimes referred to as "liberal" in this respect, many have sought practical solutions to capture the data that metal detectorists may be uncovering in their hobby. Deckers, Lewis and Thomas (2016: 428) have argued that "[T]hose with a liberal approach to metal detecting might pragmatically argue that the data of finds discovered by metal-detectorists is more important than the source." This wish to record the finds data discovered by metal detectorists, as well as a philosophy to democratize and decolonize archaeology (e.g., Dobat 2013), has led to the development and implementation of several national and regional open databases to which metal detectorists and others can report their finds.

In this chapter, we present the development of the Finnish Archaeological Finds Recording Linked Open Database (in Finnish, Suomen arkeologisten löytöjen linkitetty avoin tietokanta—SuALT), including the project rationale, comparable digital finds-recording projects in other parts of Europe, and what we have uncovered so far in our research on potential future users of the service. Metal detecting is legal in Finland, provided certain rules are followed, such as prompt reporting of finds to the authorities and avoidance of legally protected sites. Despite misgivings by some about the value of researching metal-detected finds (e.g., Knuutinen 2017), others have convincingly demonstrated the potential of researching such finds (e.g., Wessman 2015).

Fig. 1 In April 2018 the largest metal detecting rally so far in Finland took place, with circa 180 metal detectorists. Photo: Anna Wessman/SuALT

SuALT is a digital web service catering for discoveries of archaeological material made by the public; especially, but not exclusively, metal detectorists (Fig. 1). SuALT engages the citizens by providing them access to contextualized data about other related finds by linking data from different data sources in Finland and beyond.

Setting for the Case Study

In Finland, the legal hobby of metal detecting has grown rapidly in recent years. In 2011 the Archaeological Collections of the Finnish Heritage Agency (Museovirasto in Finnish) registered 31 single or assemblages of stray finds, that is, finds that have not come from organized scientific fieldwork but rather from chance discoveries. In 2014, over 2700 objects were registered; in 2015 approximately 3000 (Rohiola 2014: 18; Wessman et al. 2016: 85). In 2016, more than 2500 finds were registered (Rohiola 2017) (Fig. 2). In recent years the number of reported objects has slightly decreased and at the same time the amount of assemblages has evidently increased.

Improvement indicates that there are continuously more assemblages that include only one or just a few finds, which is an important enhancement for metal detecting in Finland. This is a step in the right direction to finding new sites rather than digging work of the Finnish Heritage Agency and museum archaeologists.

Fig. 2 Metal detecting finds from Sysmä Ihananiemi, NM 41314:1–33, 34. Photo: Ilari Järvinen, Finnish Heritage Agency

The research value for finds that are reported correctly, with contextual information such as exact finds location, is significant. As one example, the metal detectorist discoveries in Northern Ostrobothnia have changed the picture of the region's late Iron Age. Almost no finds existed from that period before the metal detectorists' activities (Kuusela and Tolonen 2011; Kuusela et al. 2013). In the city of Vaasa, detectorists found round brooches and an arm ring (NM 40033: 1–4; 40034[1]) dating to the Viking Age in 2014. This was a unique discovery which demonstrated that there was indeed Iron Age settlement in Vaasa. Later, in 2016, a trial excavation on the site pointed to a possible burial (Vanhatalo 2016). The same has been demonstrated in the city of Espoo, where no artifacts younger than AD 200 were known before metal detecting became a popular hobby. Today, thanks to metal detecting, there is evidence of a continuous settlement in the area from AD 150 to AD 1150, all properly recorded and handed over to the authorities (Wessman 2015). The potential of properly recorded metal-detected finds to contribute to archaeological knowledge is clear, considering how the Portable Antiquities Scheme (PAS) in England and Wales has transformed understanding of British archaeology. Similarly, numerous examples from the USA show that, although that country does not have a national online finds reporting system, instances where collaboration with volunteers using metal detectors have enhanced the archaeological data collected on projects are numerous (e.g., Balco et al. 2018; Connor and Scott 1998; Lees 1991).

Legally, the Finnish Antiquities Act (1963) §16 obligates the finder of an object for which the owner is not known, and which can be expected to be at least 100 years old, to submit or report the object and associated information to the Finnish Heritage Agency; the agency responsible for cultural heritage management in Finland (Finlex 2018). Metal-detected finds come from many periods (see Rohiola 2017), and the Finnish Heritage Agency has noted that metal detectorists can sometimes be uncertain which finds

[1] The number (NM) refers to the catalog numbering of the National Museum of Finland.

to report. There is also a risk, as finders get older and even pass away, that their discoveries and collections will remain unrecorded and that all associated information is lost permanently.

Publishing the information produced by citizens as open data, in a structured format and using open licenses and standards, facilitates the use of the data in research. Similarly, open data—and open access publishing of scientific results, methods and tools—enables the engagement of citizen scientists in scientific activities (Vayena and Tasioulas 2015: 483; Sanz et al. 2014: 24). The recent advancements in web technologies, including the Linked Data paradigm (Heath and Bizer 2011; Hyvönen 2012), have proliferated the initiatives for making cultural heritage data openly available on the web. While archaeologists increasingly use finds information and other data, its full utilization is still limited. Data can be hard to find, and available open data remains fragmented. Although in Finland more and more archaeological archive material is available in digitized form, like excavation reports and find catalogues, the situation is no different here, where stray finds are currently recorded in an open access digital catalogue Muinaiskalupäiväkirja (www.kyppi.fi). However, there can be long delays before these objects are catalogued and accessible for research due to limited resources. Moreover, there is no find localization data in the catalogue, meaning that researchers cannot access the exact findspot. SuALT aims to speed up the process of recording finds data, making it available more quickly for academic researchers and others to use.

Due to SuALT's goal to encourage metal detectorists, but also other finders of chance material, to record their discoveries, much of this data handled through the online system will be from outside of formal archaeological excavations. Hence it may shed light on sites and features not usually picked up through "traditional" fieldwork approaches. By engaging meaningfully with metal detectorists and other stakeholders, the project hopes to ensure that more finds are reported than at present, including retrospective recording.

The project is unique in responding to the archaeological conditions in Finland, and in providing solutions to its users' needs within the context of Finnish society and cultural heritage legislation. While it focuses primarily on the metal detecting community, its results and the software tools developed are applicable more generally to other fields of citizen science in cultural heritage, and even beyond. For example, in many areas of collecting (e.g., coins, stamps, guns, or art), much cultural heritage knowledge as well as collections are accumulated and maintained by skillful amateurs and private collectors. Engagement with SuALT is rewarded by providing the users with a personalized view to the database enriched with data from the national authorities as well as fellow finders for community building.

Fostering collaboration, and integrating and linking these resources with those in national memory organizations would be beneficial to all parties involved, and points to future applications of the model developed by SuALT. The project's team represents a broad interdisciplinary and interorganizational group, with (from the authors of this chapter alone), archaeologists, ethnologists, and cultural heritage specialists from the University of Helsinki (Wessman, Parviainen, and Thomas), cultural heritage management professionals and heritage legislation experts from the Finnish Heritage Agency (Rohiola, Kuitunen, and Niukkanen) and semantic computing specialists from the Semantic Computing Research Group[2] of Aalto University and HELDIG—the Helsinki Centre for Digital Humanities[3] (Hyvönen, Ikkala, Koho, and Tuominen).

The benefits of SuALT, aside from the huge potential for regional, national, and transnational research projects and international collaboration, are that it offers long-term savings on costs, shares expertise and provides greater sustainability than was possible before. Internationally, SuALT corresponds with the

[2] http://seco.cs.aalto.fi
[3] http://heldig.fi

development of comparable schemes in other European countries and regions, which we briefly profile later in this chapter. These all aspire to an ultimate goal of a pan-European research infrastructure, and will work together to seek a larger international collaborative research grant in the future. A contribution of our work in relation to the other European projects is to employ the Linked Data paradigm, which facilitates better interoperability with related datasets, additional data enrichment based on well-defined semantics and reasoning, and therefore better means for analyzing and using the finds data in research and applications.

The first of these European voluntary finds databases is the PAS operating across England and Wales. PAS has been significant in developing a pragmatic response to metal detecting. Numerous academic projects (e.g., Bond 2010; Brindle 2013; Campbell 2015) have demonstrated the research potential of finds data. Furthermore, research emerging from different European countries (e.g., Dobat 2013; Thomas 2012; Dobat and Jensen 2016), including Finland (Immonen and Kinnunen 2018; Maaranen 2016; Wessman et al. 2016; Wessman 2019), sheds light on the behavior and motivations of metal detectorists. This is valuable for understanding these communities ethnographically, but also for identifying the most successful ways in which to collaborate and engage, especially concerning how they contribute to the archaeological record.

Existing Finds Databases and Services

The Portable Antiquities Scheme (PAS) is the oldest voluntary finds database, currently administered by the British Museum in England and the National Museum of Wales in Wales. It is freely accessible online (www.finds.org.uk), with currently over one million reported objects. PAS was established in 1997 as an initiative to record archaeological objects found by members of the general public and was extended to cover the whole of England and Wales in 2003 (Bland 2005: 263). Already in its first full year as a national scheme, the PAS recorded 47,099 items (Lewis 2016). PAS data is available freely, under a creative commons license. The metal detectorists record their finds voluntarily. A network of 39 Finds Liaison Officers, based in museums, local authority archaeology offices, and other appropriate organizations throughout England and Wales, identify and record the finds. These are supported by a team of National Finds Advisers who also validate the finds and are available to answer queries on specific periods or object types. The success of PAS has led to huge research potential and has contributed to a considerable amount (637 at the time of writing) of academic publications, all listed on the PAS website. It is evident that the scheme has made a significant impact on archaeological knowledge in England and Wales. PAS has been a benchmark project that has guided the development of other European archaeological finds recording database projects.

The MEDEA project, based at the Vrije Universiteit Brussel, Belgium, is an open source platform for metal-detected artifacts in the federal region of Flanders. After PAS, MEDEA was the next voluntary finds database to begin development in Europe, beginning preparatory work in 2014. Metal detecting was illegal in Flanders up to April 2016, and it still is outside of Flanders (e.g., in the federal region of Wallonia). Thus, there is still a lack of confidence towards authorities which has resulted in challenges for motivating detectorists to report their finds. Detectorists record their own finds to the platform, and then MEDEA officer or a trained volunteer validates the record. This information is accessible to the Flanders Heritage Agency, and it can be used for heritage management and spatial planning purposes (Deckers et al. 2016).

In September 2016, the Portable Antiquities of the Netherlands (PAN) was initiated, with a grant from the Dutch Organization for Scientific Research, with additional funding from the National Heritage Agency of the Netherlands and Vrije Universiteit Amsterdam, the latter also coordinating the project. Similar to PAS, PAN operates a nationwide network of eight Finds Liaison Officers and three finds specialists. PAN is a reaction to the renewed Heritage Act in the Netherlands which legalized metal detection in 2016 (Roymans 2017). PAN uses Linked Open Data and some elements are also linked to existing thesauri on the internet,

using permalinks. PAN differs from the other registration systems because all objects are identified through digital reference types. This visual presentation of objects makes find recording easier for metal detectorists because objects are easier to identify and also described in the same way. In 2020, PAN will be taken over by the Dutch Heritage Agency, which will guarantee the continuation of the scheme (Heeren 2017).

DIME (Digital Metal Finds) was initiated in 2016 as a joint effort by Århus University, and Danish museums in close cooperation with metal detectorist associations (Beck 2017). In Denmark, the attitude and approach towards metal detecting has been generally positive and liberal. Metal detecting is thus an increasingly popular hobby with long roots. Most of the Danish metal detectorists are considered very competent and highly motivated (Dobat and Jensen 2016). Hence, the amateur archaeologists will register their finds into DIME independently. This also means that user experiences have been in the center of the development process of DIME. Therefore it is also possible to record finds via a mobile device app in the field (Dobat et al. 2018/2019).

The different find recording schemes have several things in common. Aside from maximizing the amount of artifact and findspot data available to researchers, public participation and open data are in the center of all the projects. This is an important aspect of democratization of archaeology and cultural heritage. All schemes promote best practices for both finders and archaeologists and they raise awareness among the public through publications and different kinds of outreach events. Moreover, the databases are linked by cooperation; they are all, along with SuALT, members of the European Public Finds Recording Network, and researchers and coordinators from each of the projects regularly cooperate in transnational meetings and advisory panels for the respective projects. All of the above databases aim to have a comparable collaboration with similar databases nationally and internationally. A core benefit of this aim is the compatibility of finds data, enabling researchers to make comparisons easily between different datasets and collections across more than one country.

User Survey Results

In order to get a better understanding of how we should begin our work, we initiated a questionnaire survey to reach out to the public—including metal detectorists, archaeologists and other heritage professionals—and see what they think about the upcoming database. This was an opportunity for respondents to express their preferences and hopes, as well as concerns, about how SuALT will function. Since the questionnaire was closed only very close to the time of writing of this chapter, we present here only initial findings.

The data collection took place in the form of an online questionnaire asking a range of multiple choice and open text questions. These questions ranged from expectations and previous experiences of artifact databases, through to motivation and more detailed features and user needs for the SuALT infrastructure. We also asked about respondent willingness to contribute to the future development of the database, for example by participating in focus groups or interviews, or even testing early versions of SuALT.

The questionnaire was created online through Google Forms, and promoted through several different email lists, and social media such as the SuALT blog (https://blogs.helsinki.fi/sualt-project/), Twitter account and Facebook page. The questions were devised first of all in English and translated into Finnish, in order to encourage both international and domestic responses. As part of the process of designing our questions, we consulted also with international public archaeology specialists (including colleagues working with PAS, MEDEA, PAN and DIME), and tested an early version of the English language questionnaire with a small sample of local metal detectorists for their feedback. We distributed the links to both questionnaires on 5 February 2018 with a response deadline of 23 March 2018.

The questionnaire surveys gained a total of 178 responses mostly from Finland (160), but also from the UK, Russia, Sweden, Norway, Denmark, Germany, the Netherlands, Switzerland, and the USA. We were pleasantly surprised at the response rate. The majority of the answers expressed enthusiasm towards the database. The main motivations mentioned for using SuALT in the future were the sense of responsibility to report finds correctly and legally (73.3%), and the chance to get feedback on finds (72.6%). Approximately 58% of the respondents also wanted to use the database for social interaction online via discussion forums or chats. Over 50% felt that they wanted to "do the right thing" by reporting their finds to the database. The key elements in mobilizing detectorists seems thus to be the feedback from the professional archaeologists and heritage managers. This has been seen also before in questionnaires (e.g., Siltainsuu and Wessman 2016: 38–39; Maaranen 2016) and reflects similar findings also from other countries where there is active engagement between archaeologists and metal detectorists (Winkley 2018: 16, 18; Thomas 2012: 61–62; Ferguson 2013).

On the other hand, there were also concerns. Some 54% of the respondents were worried that sharing their find information in SuALT would make the sites vulnerable to looters. This is a justified concern that could prevent people from using the internet access in the field (48.4%) and a fear that the recording would be too time-consuming (23.8%). This is a concern we need to take seriously during the development phases of the database in order to avoid such pitfalls. Almost a quarter of all respondents felt that they do not want to share information about their finds publicly (24.6%). This might relate to the competitiveness amongst metal detectorists and the fact that detectorists want to keep their sites to themselves (e.g., Addyman 2009: 56–59; Rasmussen 2014: 95).

Questions regarding privacy settings of the database seemed to interest the respondents the most and it also resulted in several free text answers and comments. Especially questions related to reporting find locations and having different user roles within the database, evoked opinions for and against. Only 57.4% of the Finnish respondents answered that they would wish to control the exact find locations of artifacts in the SuALT database, while the percentage was much higher in the English language questionnaire (87%). Comments (our translations) included such as:

• Information should not be open until the site is protected.

• The find location information could be available only after the site is registered in the database of ancient monuments.

• Exact coordinates should not be available only for professionals because there is the fear that other metal detectorists will "steal the place" without permission.

• The exact find spots should be shown only on municipality level, otherwise the sites will soon be looking like they have been "bombed." At least the coordinate information should be protected.

• I would dislike if there were detailed GPS data on display to everybody.

The question regarding different user roles—the possibility of different kinds of users having different levels of access to data—in the SuALT database, also differed in the answers between the two languages. A clear majority (83.3%) of the English-language questionnaire respondents believed there should be some sort of limited access or confidentiality "for security reasons," meaning that different user types would have various levels of access to the information in the database:

• I do think that it is likely better to have different levels of access for different types of users (not necessarily divided between professionals and hobbyists).

• Personal information and finds locations are sensitive, and may form an obstacle for people to contribute.

On the other hand, not all agreed with this idea, and once again the idea of democratizing archaeology emerged in one response:

• Such data and information should be free for everyone and not bound to some kind of elitism hindering its usability and meaningfulness.

However, the Finnish respondents revealed a much wider range of opinions regarding the same question. Only 59.5% thought the database should be regulating the information accessible to users depending on their user roles.

• You should register as a user to access the information. Unregistered users should only have limited access. Authorities should have all the information.

• Not everyone wants their confidential information open for everybody to see. In the worst-case scenario, one could be able to see too detailed information about what everyone is up to.

• It would be good if the database would show the user roles of everyone logged into the database (their background and country), but the find locations should be open to everyone.

• Nobody wants to work for free for hours a year, reporting all their finds if they are not allowed to access all information in the database equally with, for example, researchers.

• Are there risks for misuse if all data is open for everybody?

The difference between the answers might reflect that the English questionnaire was filled out mostly by archaeologists and that several of them had been working with similar artifact databases before. Thus, they were perhaps more familiar with potential problems related to this issue, while in Finland this is still a new and perhaps unfamiliar matter. Most of the respondents in the Finnish questionnaire were also metal detectorists.

A whole 100% of the English respondents stated no to the question of if the roles and statuses should be different between users in Finland and users abroad. Of the Finnish respondents 77.7% said no, yet in the free text answers it was possible to detect a sense of worry, especially amongst the archaeologists and authorities:

• No exact find location information for foreigners, metal detectorists coming from abroad is a problem. They should not be allowed to misuse the (SuALT) database for looting.

This somewhat nationalistic belief that looting is done only by foreigners has been noted in Finland before with interviewed metal detectorists attributing looting to, for example, Baltic and Russian detectorists (Thomas 2015: 122; Immonen and Kinnunen 2018: 17) and also on metal detecting forums and in newspapers (e.g., Niinikoski 2014). These sentiments from metal detectorists about outsiders being responsible for looting is also documented elsewhere in Europe, as for example in Belgium (Deckers 2013: 16) and in Eastern Europe especially (Musteaţă 2013: 36; Hardy 2018: 12–13).

Towards SuALT

Based on the initial feedback from the stakeholder organizations of the SuALT project and the potential users, including metal detectorists, discussed above, a first draft of the of the workflow in the SuALT system has been designed (Fig. 3). The end user is facilitated with a web interface that helps her in (1) analyzing the find, (2) creating the find report with high quality metadata at the find site (via a mobile phone), and (3) later on in managing her personal finds data via a PC with a larger screen. The underlying knowledge base is based on Linked Data and SPARQL endpoint. The Linked Data Finland platform (http://ldf.fi) is used for hosting the data as a service.

The reason for using the Linked Data approach is that in this way the Finnish finds data can be enriched with national collection data from other national archaeological sources, such as the national coin collection database, and online terminology banks and data sources, such as the Bank of Finnish Terminology in Science and Arts (http://tieteentermipankki.fi/wiki/Termipankki:Etusivu/en). In addition, the data can connect with Wikipedia-based sources Wikidata and DBpedia as well as the other European finds databases already discussed. The key idea of SuALT is to provide finders with good intellectual and computational support for analyzing and contextualizing their finds with respect to other archeological finds and knowledge and provide expert community support online by sharing knowledge. We anticipate that in this way the detectorists will stay motivated in providing and sharing their finds data with the community and in using the SuALT system. By supporting artifact finders, the quality of the input data can be raised—data quality is a key challenge in citizen science systems. At the same time, editing work needed at the Finnish Heritage Agency can be minimized.

The end-user services will be implemented on top of the aggregated and enriched Linked Data services such as Rich Internet Applications (RIA) based on JavaScript, separating fully the data service form the application layer in the browser (Hyvönen 2012). The data service is opened for everybody to use for developing applications of their own. However, details on the data opening principles and guidelines with possible restrictions still need to be negotiated and finalized based on the survey results above.

As a first step towards SuALT, a linked data repository using the current finds database at the Finnish Heritage Agency as seed data has been implemented as a SPARQL endpoint at the LDF.fi platform. On top of the service, a faceted search and browsing interface based on SPARQL Faceter (Koho et al. 2016) was created in order to get a better picture of the data already available.

Fig. 3 Workflow in SuALT

The first experiments with the existing finds database from the Finnish Heritage Agency reveal that it contains some 3000 finds, and an individual find is described with 46 fields at most. About one half of the finds are specified as metal-detected finds, curated and photographed by the Finnish Heritage Agency. All finds have location information expressed on municipality level, and in addition to that approximately half of the finds are provided with exact coordinates.

The SPARQL Faceter application collects the values of the data fields, such as object types, places, materials and time periods, into facets. At the moment the values are in literal form and do not originate from controlled vocabularies or ontologies. Over the project these facets will be developed into full-blown ontologies that will form a foundational ontology infrastructure for archaeological finds in Finland and a basis for interlinking the data with international collections whose metadata is represented using related vocabularies.

Discussion

We are still in the process of developing our final goal of SuALT as a functioning and open data research infrastructure. Informed by the survey results, as well as interviews and focus groups with metal detectorists, museum professionals, archaeologists, cultural heritage managers and others, we aim for SuALT not only to serve the needs of its different users, but for these different constituencies to truly buy into the concept and to support it.

Ethical Challenges

A key challenge for creating this new resource is ensuring that it not only conforms to and supports the Finnish Antiquities Act but that it also works in a way that encourages users to self-record their discoveries on the platform, and to feel that they are very much part of the process of developing Finland’s

archaeological record. This is an important motive for voluntary finds recording and the contribution made by detectorists and others should be recognized.

The issues related to the ownership of the data created by citizen scientists and the intellectual property rights related to research outputs that are based on the data, have to be taken into consideration (Vayena and Tasioulas 2015; Scassa and Chung 2015). When using data recorded by citizens in research, the quality aspects are also crucial—the quality can be ensured with appropriate protocols, training, and oversight (Haklay 2015; Bonney et al. 2014; Gura 2013; Cohn 2008).

Another issue open to debate in the context of digitized heritage is the question of the authenticity. Some scholars have argued that the materiality of an object is in the digitization process (e.g., Rekrut 2014). On the other hand, by digitizing information, especially if it is made open access, it increases the accessibility to a far wider audience.

As metal detecting is legal in Finland under certain conditions, SuALT adheres to Finnish law and will provide clear information to users, including advice on legal behavior. We must also address the challenge of protecting potentially vulnerable findspots, which may indicate archaeological sites, from the risk of unauthorized digging, looting, or other activities that may damage the site.

Next Steps

The work for building SuALT as a digital resource continues by surveying in more depth the existing international and national databases. The work also includes the analysis of established data models, vocabularies and ontologies for representing finds information, in order to comply with the (de facto) standards and best practices, to ensure compatibility with other data sources. An important aspect in the modeling is to take uncertainty and impreciseness into account, as the temporal and spatial expressions used in the context of archaeology are often uncertain, subjective, or vague.

Based on the investigation, also informed by the results of the questionnaire survey on potential future users of SuALT, we will make an initial plan for the system's architecture and user interface. Emphasis is given to the aspects of how to assist effectively citizens in the finds recording process, and how the quality of the collected information can be made as high as possible, utilizing automatic and collaborative methods. The development of SuALT will be an iterative process—we plan on having a pilot group of metal detectorists and others testing the initial prototype, and refine the system based on the observations. Similarly, there will be small-scale "test" research project using the database as it forms.

Conclusion

The process of developing SuALT provides an unprecedented opportunity to research the use of digital platforms to engage the public with archaeological heritage in Finland. As a self-recording scheme, SuALT will, in time, also demonstrate how the public can engage with the official processes of the Finnish Heritage Agency.

Inspired by successful initiatives across Europe, the potential for individuals to self-record their finds onto the database also echoes the emerging use of crowdsourcing for public archaeology initiatives. Therefore, SuALT offers a significant opportunity to contribute to further understanding of digital cultural heritage and its uses, including its potential role within society. While we present this chapter at the very beginning of our endeavor to realize SuALT, we are confident that its impact will be significant for Finnish archaeological heritage, and present a best practice approach that others may wish to emulate.

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References

Addyman, P. (2009). Before the portable antiquities scheme. In S. Thomas & P. G. Stone (Eds.), Metal detecting and archaeology (pp. 51–61). Woodbridge: Boydell Press.

Balco, W. M., Worick, C. P., & Shaw, C. A. (2018). It takes a community to bridge the professional-avocational divide: Collaborative archaeology at the Yahoola High Trestle. Journal of Community Archaeology and Heritage, 5(1), 30–44.

Beck, M. A. (2017, January 1). Archaeology is being revolutionised by amateur collectors. ScienceNordic. Retrieved April 6, 2018, from http://sciencenordic.com/archaeology-being-revolutionised-amateur-collectors

Bland, R. (2005). Rescuing our neglected heritage: The evolution of the Government's policy on portable antiquities in England and Wales. Cultural Trends, 14(4), 257–296.

Bond, C. J. (2010). The Portable Antiquities Scheme: The contribution of lithics and lithic scatters. In S. Worrell, G. Egan, J. Naylor, K. Leahy, & M. Lewis (Eds.), A decade of discovery. Proceedings of the Portable Antiquities Scheme Conference 2007 (pp. 19–38). Oxford: Archaeopress. British Archaeological Reports, British Series 520.

Bonney, R., Shirk, J. L., Philipps, T. B., Wiggins, A., Ballard, H. L., Miller-Rushing, A. J., & Parrish, J. K. (2014). Next steps for citizen science. Science, 343(6178), 1436–1437.

Brindle, T. (2013). Making the most of PAS data: Macro- and micro-level studies of Romano-British settlement. Landscapes, 14(1), 73–91.

Campbell, G. (2015). Ampullae, re-imbursed: A formal analysis of medieval "shell-shaped" lead-alloy pilgrim ampullae. Journal of Medieval Art and Architecture, 5(2), 97–134.

Cohn, J. (2008). Citizen science: Can volunteers do real research? BioScience, 58(3), 192–197.

Connor, M., & Scott, D. D. (1998). Metal detector use in archaeology: An introduction. Historical Archaeology, 32(4), 76–85.

Deckers, P. (2013). The past, present and future of amateur archaeological metal-detecting in Flanders, FORUM—The looting of archaeological heritage (part I). Online Journal of Public Archaeology, 3, 13–17.

Deckers, P., Bleumers, L., Ruelens, S., Lemmens, B., Vanderperren, N., Marchal, C., Pierson, J., & Tys, D. (2016). MEDEA: Crowd-sourcing the recording of metal-detected artefacts in Flanders (Belgium). Open Archaeology, 2(1), 264–277.

Dobat, A. (2013). Between rescue and research: An evaluation after 30 years of liberal metal detecting in archaeological research and heritage practice in Denmark. European Journal of Archaeology, 16(4), 704–725.

Dobat, A., & Jensen, A. (2016). 'Professional Amateurs'. Metal detecting and metal detectorists in Denmark. Open Archaeology, 2(1), 70–84.

Dobat, A., Christiansen, T., Risager, C., Henriksen, M., Holst, M., & Laursen, S. (2018/2019). The DIME project: Background, status and future perspectives of a user driven recording scheme for metal detector finds as a concrete example of participatory heritage. Danish Journal of Archaeology.

Ferguson, N. (2013). Biting the bullet: The role of hobbyist metal detecting within battlefield archaeology. Internet Archaeology, 33. https://doi.org/10.11141/ia.33.3.

Finlex. (2018). The Antiquities Act (1963). Retrieved April 20, 2018, from https://www.finlex.fi/fi/laki/ajantasa/1963/19630295

Gill, D. (2010). The portable antiquities scheme and the treasure act: Protecting the archaeology of England and Wales? Papers from the Institute of Archaeology, 20, 1–11. https://doi.org/10.5334/pia.333.

Gura, T. (2013). Citizen science: Amateur experts. Nature, 496, 259–261.

Haklay, M. (2015). Citizen science and policy: A European perspective (Case Study Series, Vol. 4). Washington, DC: The Woodrow Wilson Center, Commons Lab. Retrieved April 26, 2018, from https://www.scribd.com/document/256283024/Citizen-Science-and-Policy-A-European-Perspective

Hardy, S. (2018). 'Black archaeology' in Eastern Europe: Metal detecting, illicit trafficking of cultural objects, and 'legal nihilism' in Belarus, Poland, Russia, and Ukraine. Public Archaeology, 15(4), 214–237.

Heath, T., & Bizer, C. (2011). Linked data: Evolving the web into a global data space (1st ed.). Palo Alto: Morgan and Claypool.

Heeren, S. (2017). PAN (Portable Antiquities of the Netherlands) in practice. Paper presented at the 2017 annual meeting of the European Association of Archaeologists, Maastricht.

Hyvönen, E. (2012). Publishing and using cultural heritage linked data on the semantic web. Palo Alto: Morgan and Claypool.

Immonen, V., & Kinnunen, J. (2018). 'Quidditching' and the emergence of new heritage identities—Amateur metal detecting in Finland. Public Archaeology, 15(4), 1–23.

Knuutinen, T. (2017). 284 syytä nostaa kissa pöydälle. Raaseporin Slottsmalmenin tapaus, metallinilmaisinharrastajat ja arkeologinen tutkimus (284 reasons to bring the cat on the table. The case of Slottsmalmen in Raasepori, metal detector enthusiasts and archaeological research). SKAS, 1, 3–14.

Koho, M., Heino, E., & Hyvönen, E. (2016). SPARQL faceter—Client-side faceted search based on SPARQL. In R. Troncy, R. Verborgh, L. Nixon, T. Kurz, K. Schlegel, & M. V. Sande (Eds.), Joint Proceedings of the 4th International Workshop on Linked Media and the 3rd Developers Hackshop (CEUR Workshop Proceedings, Vol. 1615), Aachen.

Kuusela, J.-M., & Tolonen, S. (2011). A late iron age site from Siikajoki, Northern Ostrobothnia, Finland. Fennoscandia Archaeologica, XXVIII, 79–84.

Kuusela, J.-M., Ikäheimo, J., Hakamäki, V., Vilkama, R., & Salmi, A.-K. (2013). Suutarinniemi: The late iron age/early medieval cemetery of Ii (Northern Ostrobothnia, Finland). Fennoscandia Archaeologica, XXX, 126–132.

Lees, W. B. (1991). Archeology yields secrets of Mine Creek Battle. Kansas Preservation, 13(6), 1–3.

Lewis, M. (2016). A Detectorist's Utopia? Archaeology and metal-detecting in England and Wales. Open Archaeology, 2(1), 127–139.

Maaranen, P. (2016). Metal detecting and archaeology in Finland: An overview of the hobby and its consequences. ISKOS, 21, 273–284.

Musteaţă, S. (2013). Metal detecting and treasure hunters in Moldova. FORUM—The looting of archaeological heritage (part I). Online Journal of Public Archaeology, 3, 32–37.

Niinikoski, A.-K. (2014, August 18). Yöhaukat ryövääväät muinaiskohteita—luvattomat kaivaukset yleistyvät (Nighthawks are robbing ancient sites—illegal digs are becoming more frequent). YLE. Retrieved April 13, 2018, from https://yle.fi/uutiset/3-7407925

Rasmussen, J. M. (2014). Securing cultural heritage objects and fencing stolen goods? A case study on museums and metal detecting in Norway. Norwegian Archaeological Review, 47(1), 83–107.

Rekrut, A. (2014). Matters of substance: Materiality and meaning in historical records and their digital images. Archives and Manuscripts, 42(3), 238–247.

Rohiola, V. (2014). Metallinilmaisinlöydöt ja -harrastajat: Katsaus Kansallismuseon kokoelmien metallinilmaisinlöytöihin vv. 2011–2014 (Metal-detecting finds and metal-detector users—A review of the metal detecting finds in the archaeological collections of the National Museum of Finland during the years 2011–2014). SKAS, 2, 17–25.

Rohiola, V. (2017). Metallinilmaisinlöydöt kartuttavat Museoviraston kokoelmia (Metal-detected finds accumulate the collections at the Finnish Heritage Agency). Kulttuurista perinnöksi, 1. Retrieved April 17, 2018, from http://www.kulttuuristaperinnoksi.fi/valokeilassa?Article=6487

Roymans, N. (2017). PAN (Portable Antiquities Scheme of the Netherlands), aims and principles. Paper presented at the 2017 annual meeting of the European Association of Archaeologists, Maastricht.

Scassa, T., & Chung, H. (2015). Typology of citizen science projects from an intellectual property perspective: Invention and authorship between researchers and participants (Policy Memo Series, Vol. 5). Washington, DC: The Woodrow Wilson Center, Commons Lab. Retrieved April 26, 2018, from https://www.scribd.com/document/256283497/Typology-of-Citizen-Science-Projects-from-an-Intellectual-Property-Perspective

Sanz, S., Fermín, T. H.-E., Kieslinger, B., García, F. S., & Silva, C. G. (2014). White paper on citizen science for Europe. Socientize Consortium, European Commission. Retrieved May 28, 2018, from http://www.socientize.eu/?q=eu/content/white-paper-citizen-science

Siltainsuu, J., & Wessman, A. (2016). Yhteistapahtumia ja esineiden tunnistusta: Espoon kaupunginmuseon metallinilmaisinyhteistyö vuonna 2014 (Events and recording finds: Collaboration with metal detectorists at the Espoo City Museum in 2014). Muinaistutkija, 3, 34–40.

Thomas, S. (2016). The future of studying hobbyist metal detecting in Europe: A call for a transnational approach. Open Archaeology, 2(1), 140–149.

Thomas, S. (2015). Multiple-role actors in the movement of cultural property: Metal-detector users. In S. Musteață & Ș. Caliniuc (Eds.), Current trends in archaeological heritage preservation: National and international perspectives (pp. 117–124). Oxford: Archaeopress.

Thomas, S. (2012). Searching for answers: A survey of metal-detector users in the UK. International Journal of Heritage Studies, 18(1), 49–64.

Vanhatalo, S. (2016). Vaasa Höstvesi. Rautakautisen löytöpaikan koekaivaus (Vaasa Höstvesi. A trial excavation of a find spot from the Iron Age) 12.-13.5.2015. Unpublished excavation report. Finnish Heritage Agency.

Vayena, E., & Tasioulas, J. (2015). “We the scientists”: A human right to citizen science. Philosophy & Technology, 28(3), 479–485.

Wessman, A. (2019). Searching for the past: Metal-detecting and its impact on cultural heritage in Finland. In Neue Studien Zur Sachsenforschung. 68. Internationales Sachsensymposion 'Lands and Seas: Post-Roman transitions and relations across the Channel, North Sea and Baltic worlds', Canterbury 2017. Stuttgart: Konrad Theiss Verlag.

Wessman, A. (2015). Women along the River banks. New Iron Age Finds from Espoo. In J. Harjula, M. Helamaa, J. Haarala, & V. Immonen (Eds.), Mankby—A deserted medieval village on the coast of the southern Finland (pp. 17–29). Archaeologia Medii Aevi Finlandiae XXII. Mustasaari: The Society for Medieval Archaeology in Finland.

Wessman, A., Koivisto, L., & Thomas, S. (2016). Metal detecting in Finland—An ongoing debate. Open Archaeology, 2(1), 85–96.

Winkley, F. (2018). Talking to metal detectorists in the field: A methodology for analysing motivations and attitudes to landscape. Public Archaeology, 15(4), 186–213.